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ABSTRACT

The study of computer mediated communication (CMC) systems in organizations is necessary for a complete examination and explanation of organizational culture and communication. Research has shown that the effects of CMC systems have been both positive and negative. Positively, they have helped to augment oral communication. Negatively, they have had a detrimental impact on organizational communication structures. For example, some studies have shown that these technologies have bureaucratized organizational structure and shifted power to those who control computer resources. The importance of CMC is not so much its impact on information processing but its impact on the structure of organizations. Organizational researchers should examine how CMC systems become paralleled, integrated, opposed, or useful to the larger organization culture. Also, they should analyze how individuals interact with CMC machines and networks to define their role. Effective planning of organizations today requires strategic management of: (1) the role of communication technology in the evolution of the organization's culture, (2) the interaction between technology and human communication factors, and (3) the emergence of techno-cultures that may subvert the primary missions of the organization. Organizational communication scholars and consultants need to study the cultural dimensions of CMC systems before making prescriptive recommendations to organizations. (SRT)

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ORGANIZATIONAL CULTURE AND THE DESIGN OF COMPUTER-MEDIATED COMMUNICATION SYSTEMS: ISSUES FOR ORGANIZATIONAL COMMUNICATION RESEARCH

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ORGANIZATIONAL CULTURE AND THE DESIGN OF COMPUTER-MEDIATED COMMUNICATION SYSTEMS: ISSUES FOR ORGANIZATIONAL COMMUNICATION

ABSTRACT

This paper focuses on the interaction of computer-mediated communication (CMC) systems with organizational cultures, and argues that any complete analysis of organizational culture must account for the emergence of CMC cultural phenomena. CMC systems, largely ignored by organizational communication theory, have dramatically increased in scope and influence in organizations. Concurrently, the designers of these systems are operating from linear and mechanistic assumptions about human communication. Knowledge of how organizational culture and CMC systems are interrelated can aid organizations in strategically planning for the controlled development of each. In turn, communication scholars would be provided the opportunity to study the basic issues of communication theory in a relevant context.

The study of "organizational cultures" has necessarily focused on the communication aspects of human systems. Numerous types of communication variables have been included in such research, yielding relevant information on the relationships of language, rituals, norms, power relations, and interpretations of meaning within the larger organizational system. However, one major area of organizational culture development which grows within the modern organization and which has widespread effects on almost every aspect of any large organization, is what is known as computer-mediated communication. Yet, organizational culture research today has all but ignored this crucial aspect of organizational communication.

The objective of this paper is to draw attention to the issues regarding the proliferation of computer-mediated communication (CMC) systems and their effects on organizational cultures and communication. We will argue that because CMC systems are both culturally-determined and culture-determining, there is a need to examine not only the effects of CMC systems on various aspects of organizations, but also at how organizations define these systems. This is necessary because of the acceleration of CMC system adoptions, the evolutions of CMC technical sub-cultures, and the interdependence of human and machine communication mechanisms and networks. The utility of this kind of research is two-fold. First, the organizations which utilize organizational communication knowledge will be better able to strategically plan the design and implementation of CMC systems in ways congruent with their organizational goals.

Second, organizational communication reseachers and consultants will have more complete explanations and theories of how contemporary human communication functions and develops in increasingly technology-based or mediated environments.

Computer-mediated Communication Systems

Not a new topic, computer usage in organizations has been researched since the early 1960s. However, most of this research has not focused on the computer as a communication medium, but rather as an "information processor, computational device, and simulator of human mental functions (Rice and Bair, p.13)." Research in the field of communication on CMC systems is less than seven years old. What is new in this research is the examination of computers as instruments of communication and their design as systems which are claimed to facilitate human communication. In these systems, personal computing terminals are connected in networks which create "parallel office communication (Blackmarr, p.66)." The networks consist of "digital pathways" which link voice, data, and image transmissions through a series of interconnected computing and communication devices. Such devices include telephones, telex machines, video-display terminals (VDTs), voice- message systems, executive workstations, host computers, mini-computers, word processors, teleconferencing equipment, laser printers, and graphics equipment.

CMC systems provide what Danowski (p.905) calls a "highly controlled, time-sensitive, and automatically audited environment." Danowski identifies four key characteristics of these systems: 1) communication networks: 2) message content; 3) time-sensitivity; and 4) leadership. Communication networks consist of individuals or groups linked via electronic "nodes" in a configurations of message exchange. Message content consists of symbolic elements of messages and the meanings they generate. Time-sensitivity alludes to the life-cycles of CMC forms. Leadership refers to control over CMC systems. The designers of these systems focus on circuitry, methods of access, physical topology, and bandwidth (Blackmarr, p.66). Designers of CMC systems generally work for one of three types of electronics manufacturers--computer, telephone, or cable television. While being aware of the importance of human communication in organizations and the systems they design for those organizations, these designers do not utilize the theory and research data available from the field of communication (Hirsch, Hacker and Carmichael, 1985).

Users of the new communication technologies have been swept into the hyperbole of "office-of-the-future" and "office automation" rhetoric. As the moving force behind this rhetoric, the marketing teams of CMC system companies have led organizational managers to believe that human communication can be facilitated both qualitatively and quantitatively through technical means. For those managers who have accepted the claim that technical means of communication will accelerate and improve

human communication, there has followed the assumption that organizational productivity will also increase with adoption of these systems. Emphasis has increased on the use of computer systems to increase productivity and profitability in organizations (Morton, p. 44). Some users, designers, and analysts of these systems believe that CMC technology will increase the volume of office work while decreasing the number of personnel to perform certain tasks. In addition, they anticipate greater skill acquisition and career opportunities for their employees (Olson, p.71). Success of CMC systems is measured by the degree of control an organization has over operating costs, and their contributions to productivity (Guimaraes, 1981).

It is reasonable for an organization to want to improve its human communication with technology if such an improvement is possible. Managers are aware of the fact that office workers spend half of their time in communicating (Bair and Culnan, p.36). Bair and Culnan (p.37) observe that the "interaction of two or more people exchanging information is the critical process." It is obvious that CMC systems are capable of aiding the interactions of people in organizations. The benefits to organizations include reductions of the number of clerical tasks per clerical activity; reduction of "shadow functions;" reduction of media transformations; increased speed of data transmission; greater managerial control over information; and better access to data (Rice and Bair, p.211).

However, not all the effects of these technologies have been as positive. Goldberg (p.44) observes that "the majority of computer installations in the past decade have been deemed 'failures' ranging from disappointment in cases where the system did not yield the benefits expected to disaster where financial control of the company was irretrievably lost." Many other types of negative effects have been noted. These include personnel displacement (Goldberg, 1982); more routine and repetitive jobs (Goldberg, 1982); lower wages and higher stress (Olson, 1982); repressive monitoring and regimentation of employees (Mosco, 1982); problems in human-machine interactions (Sime and Coombs, 1983); cognitive dysfunctions (Kerr and Hiltz, 1982); damage to interpersonal communication networks (Ellis and Nutt, 1980); and isolation of departments in organizations through private data access and utilization (Freeman, 1985).

While much information about the use of CMC systems in organizations has been compiled, little is known about the effects of CMC systems on organizational cultures. Nor is it clear how knowledge about organizational cultures can aid in the design of more effective CMC systems. If one can assume that human communication and culture in organizations are interrelated, and that CMC systems are both determining of and determined by them, then research linking these two areas should prove to be very fruitful.

Organizational Culture

One of the major perspective of organizational communication research is the cultural perspective. Definitions of organizational culture vary somewhat. Harris (p.15) provides the following definition:

> The term culture is used in the broad sense as the unique lifestyle of a group of people, the coping strategies and skills developed and adapted for particular purposes. It represents a body of communicable knowledge and learned behavior that humans acquire and pass on for survival and success within an environment.

Putnam (1985, p. 9), on the other hand, defines culture in the following way:

> As an anthropological concept, culture refers to a social unit's collective sense of what reality is, what it means to be a member of a group, and how a member ought to act. Although students of "organizational culture" approach their subject in a variety of ways, most of them stress the achievement of intersubjective meaning, understanding, and common pursuits among organizational members.

Defining criteria of organizational culture include a coherent set of norms, values, and procedures. These are learned primarily through interpersonal interactions.

Much of the research done on CMC systems has been mechanistic in nature. That is, it has focused on channels, effects, and bits of information; in other words, the circuits and wires of communication networks. This research has not dealt with the cultural aspects of either the organization or the CMC technologies. Rice and Bair (p.68) note that:

> One problem with many current adoption and impact studies is an unbalanced emphasis on the amount and functionality of information... From this perspective, a paradoxical implication of organizational communication systems is that they may **increase** the extent to which members use information for symbolic, rather than functional purposes, because of the higher visibility and political consequences of more complex systems. Thus, theories of information system adoption need to consider how the meaning of the information provided and of the system itself are negotiated in organizations.

Many organizational communication researchers have been adopting methods of cultural analysis to their study of organizations (Goodall, p.139). These methods, if used to study the design and implementation of CMC systems may provide insights about the organizational effects of the technologies that are not identifiable in the channel studies mentioned above. In addition to observing the effects of the CMC systems, we can also observe how they are affected. In other words, we will gather observations about the ways in which CMC systems develop their role in organizations. In so doing, it may be possible to locate meanings that guide behaviors regarding the design, usage, and

evolution of both the CMC technologies and the organizations in which they function. From this perspective, communication is not the variable manipulated by the mediating devices, but the key cultural force that defines the roles and functions of their operation. To date, the research on CMC systems has described their operation as too removed from cultural factors which they must inherently draw from and impinge upon. In turn, the research on organizational cultures has tended to neglect the factors of communication technology which are endemic to cultural structures and processes.

Techno-culture

As the general organizational culture provides rules of behavior and language for the overall organization, so do the more specialized sub-cultures within the organization. One of these sub-cultures is the technical culture comprised of CMC analysts and users. The effects of this technical group may be more consequential than the effects of the computers themselves in terms of what the technologies do within an organization. Harris (p.118) argues that the "attitudes about human interaction in the work culture" are being changed in the evolution of these technical cultures. Describing how managers are becoming increasingly aware of communication and their ability to control it, he notes (p.124):

> Since they are part of the technological culture, they advance their knowledge of new tools for management information sytems, both hardware and software. They

strive to develop their comprehension and expertise in interpersonal, group, and organizational communication.

Communication scholars should recognize that technical people in organizations, both analysts and users of CMC systems, are not only dealing with human communication, but attempting to improve their skills in handling communication matters.

There are new roles that are emerging in organizations that observers of communication must be aware of. These roles correspond to the access which individuals have to various CMC protocols. For example, "information workers" is a class of employees who are allowed entrance to and retrieval of data which are restricted to other employees. Mathias (p.23) says that information workers are "people whose jobs involve managing data and making decisions based on the recognition of patterns within that data." As organizations become larger and more complex, these workers become more specialized in what they do. Departments become more specialized. Control of information becomes more important as the flow of information becomes more expeditious. This increased specialization within the technical sub-cultures of an organization, leads to what Olson (p.73) calls "professionalization." In the extreme case, professionalization may contribute to parochialism, in which one group of technical experts perceives its activities as the most important in the organization. Data processing (DP) professionals have long been accused of being parochial, showing more loyalty to their

profession than to the organization in which they work.

A "techno-culture" arises within an organization as CMC systems become more important and certain key people are in charge of designing, accessing, and controlling them. But this sub-culture is not only the result of the technologies. Like any other, it has to do with how human relationships are treated in the larger organizational culture.

If the CMC techno-cultures are parochial and isolated from other parts of the organization, it is reasonable to assume that they begin to develop their own codes of communication. In addition, if these groups become not only isolated, but dominant in their control over strategic data utilized in the communication of others in the organization, then they can be viewed as having certain power over the communication of others. Additionally, there is the possibility of the diffusion of the techno-culture's modes of communication through various media into the rest of the organization. Nadler refers to this problem as "too strong an identification with a particular microculture (Harris, p.17)." Harris (p.130) notes that in many organizations, "in trying to improve organizational communications...managers will probably turn to technical and hardware solutions." Managers rely on Data Processing (DP) and Management Information Science (MIS) personnel to handle everything related to data, information, and communication in an organization. Harris makes the following interesting observation (p.137):

> L.Duverger of Diebold France envisioned the "generalization of the information sciences"---not just more universal understanding and use of the computer, but increased appreciation of its ability to do more specific tasks in a variety of fields. Systems engineers will design for undertakings and specializations for which there are no computer applications today. Speaking at this Paris convocation, I anticipated that MIS personnel will become more cosmopolitan, eventually becoming professional organizational communications consultants.

An implication of what Harris is saying is that the techno-cultures have aspirations of designing not only hardware and software to accomodate existing patterns of human communication, but to work with how people communicate in organizations in general. One might wonder what role theory of organizational communication plays in this situation. According to Brotz (1983), there has not yet been constructed a social etiquette for CMC system use. Observing its emergence will be interesting. If it emerges from the techno-cultures, perhaps we should begin in-depth examinations of their norms and rules.

Matching Organizational Cultures with CMC Systems

Mayantz (p.174) says that studies of the consequences of information technologies have rarely been done at the organizational level. He also notes that there has been a neglect of technology in organizational theory in favor of an emphasis on social interaction (p.176). Bjorn-Andersen (p.2) states that those who are experts in the design and implementation of information systems have been too restricted in their perception of the design process. We suggest that CMC systems be studied at the organizational level and that these

technologies cannot be neglected in any complete analysis of organizational communication. An alternative to techno-cultures and technology-driven changes in organizations is the integration of organizational culture with the birth and development of CMC technology. This does not suggest a simple fitting of technology to culture, but rather an iterative design of the technological system which integrates the machines into the existing cultural patterns and evolution.

A problem that now exists is that culture is tied to modes and media of communication and the latter may lead the former. As communication symbols and technology change, so often does culture (Harris, p.117). Simplistic ideas of using technology to add value or increase the speed or volume of human communication are not workable, since increased communication activity has a point of negative return, where information overload and diversion of work from necessary tasks result (Rice and Bair, p.188).

If it is desirable to match CMC system design with organizational culture, we must first identify what elements of organizational culture are within the domain of CMC technology. Harris (p.32) notes six major dimensions of organizational culture as being 1) identity, 2) purposes, 3) style, 4) processes and activities, 5) communication and information, and 6) human relations. Rice and Bair (p.200) note that there are six levels of organizational communication performance: 1) mission, 2) purpose, 3) functions, 4) processes, 5) activities, and 6)

actions. Organizational missions or identities are critical to how people perceive their daily activities and roles in the organization, how they develop a sense of self with corporate space, and how the organizational philosophy, rhetoric, and images evolve. These activities are historical and deal with much more than the daily functioning of employees and managers. Clearly, they are in turn controlled by the missions and identities of the culture.

Another significant dimension of organizational culture relevant to CMC systems, is organizational purpose. Decision-support systems, for example, can aid managers and executives in determining goals and objectives for the organization by providing needed data and information. The style or ambiance of an organization is more related to the character or atmosphere created by factors other than CMC technologies. An exception may be when the machines are accentuated in ways that allow the development of some sort of technical climate. Since the CMC systems are designed to help employees communicate in ways that better coordinate time and space dimensions of personnel and management tasks, they are necessarily an integral part of organizational processes and activities. Obviously, communication is in the domain of these systems, but we do need to ascertain what specific aspects of communication can best be facilitated by CMC technology. While it is commonly assumed that the objectives of CMC systems is the transmission and processing of data, they also appear to affect both formal and informal interpersonal relationships in organizations. Studies on this

aspect of the technologies are too new to be conclusive. More research is needed on the connection of CMC systems with the formation, maintenance, and termination of human relationships.

Bair and Culnan (p.37) say that the four major functions of organizational communication are 1) information, 2) control, 3) motivation, and 4) emotive. If information is viewed in the traditional sense of communicated data which reduces uncertainty, CMC systems fulfill that function. Control is an issue of CMC system design that is critical to an understanding of the modern office. Not only is data-access controlled, but also are interpersonal communication channels, privacy of individuals, and structures of overall organizational communication. In addition, channels of communication are subject to the re-routing of technical controllers. Messages are subject to monitoring and unrequested transferring. Motivation of personnel may not be as closely related to CMC systems. Emotive factors and how they affect or are affected by the systems are not yet known. It can be argued however, that expressions of feelings, involvement, and the establishment of trust and credibility can be facilitated by CMC technology.

Pacanowsky and O'Donnell-Trujillo (p.127) assert that communication is not the transfer of information, but rather is language usage. Research on the cultural dimensions of CMC systems should thus account for the language usage in the organization, and how the techno-culture terminology is adopted, modified, rejected, transformed, and diffused into the overall

organization. One effort in this research might be a focus on the text-based nature of CMC communication and how that relates to the interpersonal communication. In language analysis of this type, one might discover values in the organization which are developing as the CMC system modifies the organizational communication practices. Concomitant with this might be an examination of the relationships between new language changes and the routinization of certain behaviors and interaction rules.

Thus, several dimensions of organizational cultures are subject to influence by the new communication technologies. These include:

1. processes and activities
2. information exchange
3. information control
4. communication monitoring
5. interpersonal relationships
6. language acquisition and usage
7. values
8. rules and norms

Research on such dimensions can contribute to knowledge concerning how CMC technical subcultures can be matched with larger organizational cultures.

Cultural Constraints on CMC Systems

Although CMC systems have significant impact on organizational cultures, factors such as organizational philosophy and missions, management styles, attitudes toward

technology, and views on communication in general, can shape these effects (Bair and Culnan, p.38). Volume, type, and direction of communication may be more culturally-determined than technology-determined. So may channel-selection. While CMC systems may create new norms and customs, it is possible that these may function only in small groups or in technical sub-cultures, or that the larger organizational norms and customs override them. In the case of electronic messaging, it may be possible to have horizontal communication because the technology expedites inter-departmental information exchange. However, the actual practice of such communication is subject to the control and intervention of organizational superiors and/or systems analysts. Remote work for managers or information workers is technically possible (Olson, 1982), but is subject to the cultural norms of a given organization. De-centralization of communication and work groups has been predicted since CMC systems allow the formation of satellite work areas and offices. Autonomy of certain work groups in functional areas of organizations has also been made more likely (Mathias, p.23). However, the occurrence of these changes does not appear to be simply the direct result of the availability of technical means. Rather, the interaction of CMC technology with organizational cultural patterns seems to have a large role in determining what changes are manifested. Smith (p.26) claims that the adoption of new technologies means that technical departments will begin to overlap and that new departments will emerge and create jobs in information management. If so, we need to know what changes will

result in organizational communication. Another cultural constraint which we know little about, is the resistance to technology that organizations often have, even when technological change was agreed upon. A typical case might be the company that installs a computer system with one hundred features, and uses only ten of them. Olson (p.75) notes that it is possible that clerical workers may find their work more routinized and fragmented, with less control over what they do. On the other hand, they may find their tasks pleasantly varied, and their career potentials enhanced. Which result occurs may be a function of the interaction of the organizational culture with the organizational CMC systems.

How an organization defines itself in its cultural forms may indicate how its adoption of CMC systems will develop. It may be that the technology will follow the trends of the culture, and how the culture controls its technological self-expression. The amount of control and authority that managers have over these systems is indicated in the fact that manager productivity has not increased with the implementation of CMC systems (Olson, p.75). Managers tend to prefer face-to-face interactions over mediated communication. According to Rice and Bair (p.203), CMC systems "may have greater productivity benefits for the more clerical and transactional processes (or for interorganizational exchanges) and less so for more managerial processes." They also note that most managerial communication is oral. Therefore, it may be that the technology which will improve communication in organizations is also that which will augment oral forms of

interaction. Multi-media systems which can reduce preparation and documentation times as well as efforts in constructing and disseminating memos and notices of meetings, can aid the manager's oral communication by providing more time for face-to-face oral encounters. Simple augmentation of existing cultural forms may be viewed as direct enhancement of organizational communication. However, it may be the case that these communication technologies go beyond augmentation and actually transform what they serve.

Zuboff (p.148) comments on the changed environment created by these systems:

> I call it the "information environment." It refers to a quality of life that emerges when the computer mediates jobs and begins to influence both horizontal and vertical relationships. . . . The capacity for follow-up and reorganizing increases as information retrieval and communication can occur with greater ease and convenience than ever before.

Zuboff helps us to recognize that CMC systems may change entire cultural environments. Perhaps organizational cultures on the macro-level in organizations can constrain the effects of technical sub-cultures as groups. However, the technical transformations, climates, and communication media created by the systems themselves may have gradual and deep impact on the larger culture. The worst scenario is that painted by Crozier (p.88) which portrays organizational roles as "over-formalized" and

"over-structured" with "programmed rules controlling decision-making and other organizational processes."

Cultural Strategic Planning

Information systems experts say that information and communication systems should be planned along with an overall strategic business and organizational plan (Mathias, p.19). Managers are encouraged to involve themselves in this planning. Top managers should participate because they are the ones with the greatest grasp of what the organizational culture is all about, especially in terms of objectives and missions. Unfortunately, this kind of planning is rarely done. Connell (p.24) observes:

> ..emphasis is again on the machine, their speeds and their capacities, rather than on how their capabilities can be used to improve performance. The orientation has been toward technology as an entity unto itself, rather than toward how technology should be **managed** to achieve an end.

The method of strategic planning that is most appropriate for CMC sytems is what Guimaraes (p.15) calls an "iterative assurance process." In this process, system designers reduce the uncertainty about what users need by creating feedback loops in determining user requirements. This may be one part of the design process in which communication consultants may be useful. These consultants could aid in increasing degrees of personal

contact in planning stages, facilitating small group decision-making, promoting "social presence" in the system, and helping both designers and users recognize the affective in addition to the content dimensions of messages and information. For example, a telephone call, while lacking visual cues and suppressing certain paralinguistic data, can be made more personal and affective by the use of more personal language. Moreover, communication consultants can help an organization match its culture with the CMC systems, especially with iterative designs that give the systems serving roles rather than transforming roles. Before planning and implementing a CMC system, an organization must first analyze its human communication patterns and dynamics. Before installing potential culture-transforming technologies, the organization should determine what transformations are desirable. Also, the organization should correct any problems in human communication and culture before hard-wiring these into CMC networks.

Issues and Directions

Organizational communication research must take account of CMC system technologies in organizations. Because of their control, transformation, and inputs into the human communication dynamics of an organization, they are one of the most important factors in the development and modification of organizational cultures. While CMC systems deal with information and communication, the information-processing approach to organizational communication research is not sufficient to

explain the problems of CMC system design or their effects. The technical techniques of transmitting bits of digitized data are highly advanced, fast, and flexible. But in dealing with the uses and effects of these technologies beyond passing bits of data, we need to look at culture, language, interaction networks, rituals, norms, etc. While it is interesting to talk about information theory and information systems, we still do not know the critical properties of information (Resnikoff, p.121; Checkland, p. 10). Yet information is considered the primary currency of organizations (Connell, p.29). Vallee (1982) has made a useful start in characterizing information by distinguishing it from data. Data, he says, are what can be stored and retrieved. They are not the same as information. Data become information when they are communicated. We should realize that the emphasis on information efficiency and speed treats information as material inputs and outputs (Rice and Bair, p.187). We know that communication is purportedly enhanced by these systems. However, communication is treated by designers as information-exchange and by communication scholars as relationships and sharing of meaning. According to Fisher (1985), we do not know enough about relationships to explain communication to people adequately. Perhaps an organizational cultural approach to the design and use of these systems can provide insights into a more meaningful distinction between information and communication.

There are numerous political, ethical, and moral questions that may arise when locating CMC technology within organizational culture. Consider again the power engendered by technical sub-cultures and the power struggles that ensue. Technology-driven perspectives such as those promoted by Bell Labs, suggest that the efficiency of communication is the central concern to CMC systems. Conditions in which "the communication purposes are information and control" are the best suited for these systems (Bair and Culnan, p.38). Political struggles between factions within a technical sub-culture may also be an issue. Connell (1983) says that these struggles result from problems of access and control. Privacy becomes an issue as it becomes increasingly known that personal communication can be monitored, interrupted, and denied by the planners and controllers of these systems.

Despite the claims of those who market and design CMC systems, the usage and acceptance of these systems is not what they have expected (Stewart and Finn, p.20). Usage has been surprisingly low. Three issues that might arise from these observations are: 1) What keeps people from accepting and adopting the technologies, 2) what propels them toward acceptance, and 3) what changes do they undergo in the transition from rejection to acceptance?

Schremser and DePietro (p.2) discovered that CMC systems lead to an increase in communication between and within work groups in organizations, including an increase in informal and

face-to-face interactions. Such research addresses the central issues concerning how these technologies affect the ways in which people communicate in organizations.

Another issue in CMC design and operation in organizations arises from their definition within the organizational culture. Schremser and DePietro (p.26) found that changes in communication patterns related to CMC systems are linked to feelings about the relationship between communication and the sense of influence and control employees have. In some organizations, elements of CMC systems are used to reward employees, such as the valued executive who merits a personal computer terminal or workstation in his or her office.

As CMC systems evolve, new norms of communication do also (Fulk and Van Tassel, p.18). These new norms may create new meanings for communication. Verbal and nonverbal coding customs may gradually change. This suggests exciting possibilities for communication research on the observable changes in communication behaviors over time. Communication theorists have the challenge to construct theories of communication that have application in increasingly technological organizations.

While technologists may look for ways to streamline communication and replace one kind of medium with another, research indicates that the new media are not always appropriate substitutes for the existing modes of human communication. Instead of replacing channels of human communication, they seem to augment them. An example of this is teleconferencing. While

the technology of teleconferencing has been around for fifty years, it has not resulted in reductions in travel that correspond to the increases in teleconferencing adoption (Olson, p.86). People still want to travel, and they still want to talk face-to-face. However, teleconferencing has increased the volume of communication, and in ways not yet understood, may have changed the nature of certain communication processes.

Clearly, CMC systems alter traditional notions about human communication. For example, asynchronous computer-conferencing blurs the distinctions between sender and receiver. Vallee (p.131) says that because system designers are linear and mechanistic in their thinking, they want users to be taught how to "system-think." If members of organizations begin an evolution into system-think, all aspects of organizational culture may be subject to standardization, control, and reliance on machines. Perhaps we in the field of communication should explore methods of teaching employees how to communication-think.

There are many possibilities for research on the cultural dimensions of CMC systems in organizations. They include such topics as:

1. the digitizing emotional factors in communication.
2. comparisons of formal and informal CMC networks.
3. emergence of CMC sub-cultures.
4. CMC language acquisition and diffusion.
5. relationships between non-technical and technical cultures.
6. CMC network cultural centers of influence.

7. power struggles related to CMC formalizations.
8. access and distribution of cultural information.

Conclusions

The study of CMC systems in organizations is necessary for a complete examination and explanation of organizational culture and communication. This study offers the field of communication the potential for developing new theories of communication in ready-made laboratories of natural cultural genesis and evolution. To leave CMC technologies out of contemporary organizational culture analysis is analogous to leaving telephones and televisions out of an analysis of American culture. Research shows us that the effects of CMC systems have been both positive and negative. On one hand, they have helped to augment oral communication. On the other, they have had some deleterious impact on organizational communication structures. Some studies show for example, that these technologies result in the bureaucratization of organizational structure and shifts in power to those who control computer resources (Bjorn-Andersen and Rasmussen, p.120). What this implies is that the importance of computer-mediated communication is not in information-processing as much as it is in organizational re-structuring.

Simple effects studies of CMC systems are inadequate because of the reliance of users on how systems are defined by the organization, how they are configured and controlled, and how users themselves define their interrelationship with the system. CMC technologies are flexible in technical culture. How a CMC

system becomes paralleled, integrated, opposed, or serving to the larger organizational culture is a point of inquiry that should draw the interest of many organizational researchers.

In the organizational culture, the relationship of the CMC machines and networks and how the individual user interacts with these to define his/her role is another point of inquiry. CMC technology can be used to reward employees and in other controlling ways. The initial design and implementation of a CMC system has a direct effect on the cultural role and status of an employee. Will information be important because of its content dimensions, or will it increasingly be used as an instrument of power and control? What sorts of hierarchies of access and distribution will be designed?

For those of us who study and theorize about human communication, there is the issue of new conceptualizations of communication in the technical environments and cultures. Will the sharing of meaning become mediated sharing of meaning? If so, what will the mediation do to the sharing and to the meaning?

We believe that organizational communication scholars and consultants need to study the cultural dimensions of CMC systems before making prescriptive recommendations to organizations. Psychologists have not waited. Harris, for example, advocates improving interpersonal and small group skills (p.144). Zuboff (p.152) says that managers need to consider the consequences of CMC technologies for humans and the quality of their work settings. These kinds of prescriptions may have some use, but

are too general. Organizations need specific things to do in regard to CMC system planning and control. Not only do they need to understand their cultures, but also how to match them with CMC systems. Effective planning of organizations in today's context of rapidly accelerating communication technology, requires strategic management of: (1) the role of communication technology in the evolution of the organization's culture, (2) the interaction between technology and human communication factors, and (3) the emergence of techno-cultures which may subvert the primary missions of the organization.

REFERENCES

Abelman, R. and Camden, C. (1985). Different strokes for different folks: Participant observation in organizational research. Paper presented to the International Communication Association, Honolulu, May 1985.

Allen, B. (1982). An Unmanaged computer system can stop you dead. Harvard Business Review. November-December, 1982.

Andersen, N.B. (1980). Sociological implications of computer systems. Human Interaction with Computers. H. T. Smith and T.R.G. Green (eds.) London: Academic Press.

Bair, J.H. and Culnan, M.J. (1983). But where do you start? Management Technology. May 1983.

Blackmarr, B.R. (1984). Networking: Surveying the lay of the LAN. Modern Office Technology. July 1984.

Brotz, D.K. (1983). Message system mores: Etiquette in Laurel. ACM Transactions in Office Information Systems. 1, 179-192.

Checkland, P.B. (1984). Systems Theory and Information Systems. Beyond Productivity: Information Systems Development for Organizational Effectiveness. Th. M.A. Bemelmans (ed.) North-Holland: Elsevier Science Publishers.

Connell, J.J. (1983). Is there an office of the future? Management Technology. May 1983.

Crozier, M. (1981). Implications for the organization. New Office Technology: Human and Organizational Aspects. H.J. Otway and M. Peltu (eds.).

Danowski, J.A. (1983). Computer-mediated communication: A network-based content analysis using a CBSS conference. M. Burgoon (Ed.), Communication Yearbook 7. Beverly Hills: Sage.

Ellis, C.A. and Nutt, G.J. (1980). Office information systems and computer science. Xerox Palo Alto Research Center.

Fisher, B.A. (1985). Address to the Department of Speech, University of Oregon, Spring 1985.

Fulk, J. and Tassel. J. (1985). Nonverbal communication in electronic messages. Paper presented to the International Communication Association, Honolulu, May 1985.

Glaser, S. (1983). Accessing organizational culture: An interpretive approach. Paper presented to the Speech Communication Association, Washington, D.C.

Goldberg, L.A. (1982). Information managers: The key to computer success. CA Magazine. August 1982.

Guiliano, V.E. (1982). The mechanization of office work. Scientific American. September 1982.

Guimaraes, T. (1981). Understanding implementation failure. Journal of Systems Management. March 1981.

Gratz, R.D. and Salem, P.J. (1984). Technology and the crisis of self. Communication Quarterly. Spring 1984.

Harris, P.R. (1983). New World, New Ways, New Management. New York: American Management Association.

Heimstra, G. (1983). You say you want a revolution? Information technology in organizations. R.N. Bostrom (Ed.) Communication Yearbook 7. Beverly Hills: Sage.

Hirsch, K., Hacker, K., and Carmichael, C., (1985). Design problems in computer-mediated communication systems: Implications for the field of communication. Paper presented to the International Communication Association, Honolulu, May 1985.

Johansen, Robert; Vallee, Jacques; and Spangler, Kathleen. Electronic Meetings: Technical Alternatives and Social Choices. Reading, Massachusetts: Addison-Wesley, 1979.

Kerr, E.B. and Hiltz, S.R. (1982). Computer-Mediated Communication. New York: Academic Press.

Landau, R.M., Bair, J.H., and Siegman, J.H. (1982). Emerging Office Systems. Norwood: Ablex.

Mathias, J.E.(1982). Strategic communication management. Journal of Systems Management. October 1982.

Mayantz, R. (1984). Information systems and organizational effectiveness: The sociological perspective. Beyond Productivity: Information Systems Development, Th.M.A. Bemelmans (Ed.) Amsterdam: Elsevier Science Publishers.

Mosco, V. (1982). Pushbutton Fantasies. Norwood: Ablex.

Olson, M.H., (1982). New information technology and organizational culture. MIS Quarterly. Special Issue 1982.

Pacanowsky, M.E. and O'Donnell-Trujillo, N. (1983). Organizational communication as cultural performance. Communication Monographs. 50, 126-147.

Philipps, A. (1982). Computer conferencing: Success or failure? Systems, Objectives, Solutions. 2, 203-218.

Picot, A. (1982). Office technology: A report on attitudes, and channel selection from field studies in Germany. Communication Yearbook 6. M. Burgoon (Ed.) Beverly Hills: Sage.

Putnam, L. and Cheney, G. (1985). New directions in organizational research: A research review. Speech Communication in the Twentieth Century. T.W. Benson (ed.) Carbondale: Southern Illinois University Press.

Rice, R.E. and Bair, J.H. (1984) New organizational media and productivity. The New Media. R.E. Rice (ed.) Beverly Hills: Sage.

Schremser, G.M. (1985). The impact of robotics and highly automated equipment on communication and other job outcomes at a large manufacturing plant. Paper presented to the International Communication Association, Honolulu, May 1985.

Sime, M.E. and Coombs, M.J. (1983). Designing for Human-Computer Communication. New York: Academic Press.

Vallee, J. (1982). The Network Revolution: Confessions of a Computer Scientist. Berkeley: And/Or Press.

Zuboff, S. (1982). New worlds of computer-mediated work. Harvard Business Review. September-October 1982.